



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 16, 2024 – 07:17 AM EDT

PDB ID : 5DSE  
Title : Crystal Structure of the TTC7B/Hyccin Complex  
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Deposited on : 2015-09-17  
Resolution : 2.90 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1



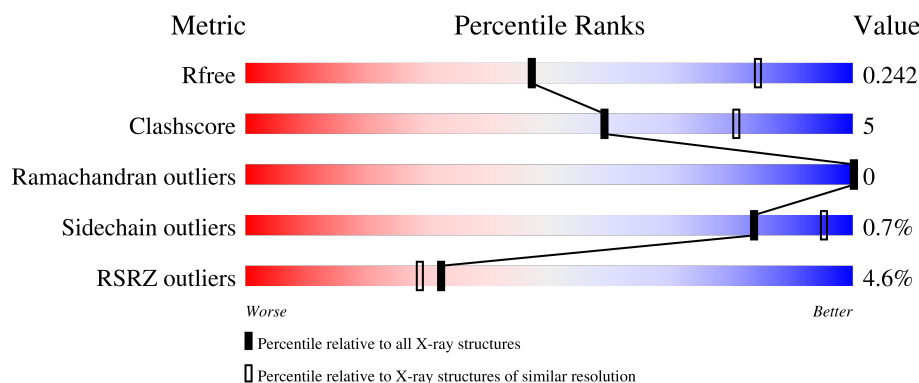
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.90 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	837	<div> <div>3%</div> <div>57%</div> <div>7%</div> <div>36%</div> </div>
1	C	837	<div> <div>2%</div> <div>75%</div> <div>10%</div> <div>15%</div> </div>
2	B	312	<div> <div>8%</div> <div>63%</div> <div>12%</div> <div>26%</div> </div>
2	D	312	<div> <div>2%</div> <div>69%</div> <div>15%</div> <div>15%</div> </div>



## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 13875 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Tetratricopeptide repeat protein 7B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	537	Total	C	N	O	S	0	0	0
			4242	2714	730	771	27			
1	C	712	Total	C	N	O	S	0	0	0
			5647	3591	982	1042	32			

- Molecule 2 is a protein called Hyccin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	231	Total	C	N	O	S	0	0	0
			1844	1205	293	334	12			
2	D	264	Total	C	N	O	S	0	0	0
			2091	1357	338	383	13			

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-3	GLY	-	expression tag	UNP Q9BYI3
B	-2	PRO	-	expression tag	UNP Q9BYI3
B	-1	LEU	-	expression tag	UNP Q9BYI3
B	0	GLY	-	expression tag	UNP Q9BYI3
B	1	SER	-	expression tag	UNP Q9BYI3
D	-3	GLY	-	expression tag	UNP Q9BYI3
D	-2	PRO	-	expression tag	UNP Q9BYI3
D	-1	LEU	-	expression tag	UNP Q9BYI3
D	0	GLY	-	expression tag	UNP Q9BYI3
D	1	SER	-	expression tag	UNP Q9BYI3

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	17	Total	O	0	0
			17	17		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	C	32	Total 32	O 32	0	0
3	D	2	Total 2	O 2	0	0



**i**

- Molecule 1: Tetratricopeptide repeat protein 7B









## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	71.78Å 168.07Å 239.67Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.96 – 2.90 29.96 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.4 (29.96-2.90) 96.4 (29.96-2.90)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	5.32 (at 2.90Å)	Xtriage
Refinement program	PHENIX (phenix.refine: dev_1630)	Depositor
R, $R_{free}$	0.212 , 0.242 0.215 , 0.242	Depositor DCC
$R_{free}$ test set	2000 reflections (3.08%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	73.1	Xtriage
Anisotropy	0.249	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 43.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	13875	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	90.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.13% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.



## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	0.23	0/4319	0.37	0/5839
1	C	0.23	0/5747	0.38	0/7771
2	B	0.23	0/1887	0.40	0/2560
2	D	0.24	0/2140	0.42	0/2903
All	All	0.23	0/14093	0.39	0/19073

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4242	0	4292	38	0
1	C	5647	0	5715	47	0
2	B	1844	0	1847	21	0
2	D	2091	0	2096	31	0
3	A	17	0	0	1	0
3	C	32	0	0	0	0
3	D	2	0	0	0	0
All	All	13875	0	13950	131	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

The worst 5 of 131 close contacts within the same asymmetric unit are listed below, sorted by



their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:274:GLU:HG2	2:D:275:PRO:HD3	1.58	0.85
2:B:274:GLU:HG2	2:B:275:PRO:HD3	1.61	0.83
1:C:482:LEU:HD23	1:C:841:ARG:HH11	1.55	0.72
1:A:187:LEU:HD21	1:A:253:THR:HB	1.73	0.70
1:A:180:GLY:HA3	1:A:241:ARG:HH22	1.55	0.70

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	523/837 (62%)	514 (98%)	9 (2%)	0	100	100
1	C	696/837 (83%)	687 (99%)	9 (1%)	0	100	100
2	B	217/312 (70%)	213 (98%)	4 (2%)	0	100	100
2	D	254/312 (81%)	247 (97%)	7 (3%)	0	100	100
All	All	1690/2298 (74%)	1661 (98%)	29 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.



Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	445/708 (63%)	442 (99%)	3 (1%)	84	95
1	C	601/708 (85%)	595 (99%)	6 (1%)	76	92
2	B	207/279 (74%)	206 (100%)	1 (0%)	88	96
2	D	236/279 (85%)	235 (100%)	1 (0%)	91	97
All	All	1489/1974 (75%)	1478 (99%)	11 (1%)	84	95

5 of 11 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	401	TYR
1	C	435	LEU
2	D	248	PHE
1	C	736	ARG
1	C	17	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	775	HIS
1	C	811	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.



## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.



## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	537/837 (64%)	0.04	29 (5%) 25 22	43, 78, 176, 226	0
1	C	712/837 (85%)	-0.16	20 (2%) 53 49	43, 67, 136, 211	0
2	B	231/312 (74%)	0.47	24 (10%) 6 5	65, 113, 191, 233	0
2	D	264/312 (84%)	0.07	7 (2%) 54 50	51, 85, 156, 191	0
All	All	1744/2298 (75%)	0.02	80 (4%) 32 29	43, 77, 169, 233	0

The worst 5 of 80 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	151	CYS	8.2
2	D	114	VAL	5.9
1	C	300	ASN	5.6
1	A	189	GLU	5.1
1	A	150	LEU	4.7

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 6.4 Ligands [i](#)

There are no ligands in this entry.



## 6.5 Other polymers [i](#)

There are no such residues in this entry.